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THE AMERICAN ANTELOPE, OR PRONG BUCK.

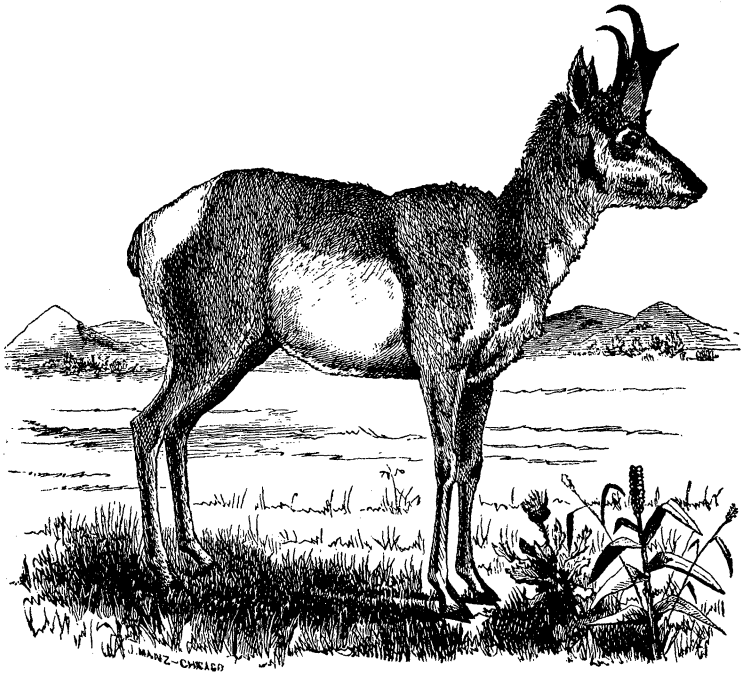
BY HON. J. D. CATON.

IT is not possible to give more than a synopsis of the natural history of the American antelope in the space which may be properly allowed in this journal. It was first made known to the scientific world through Lewis and Clark, who found it in 1804 on the Upper Missouri, and who at times made it an important object of the chase. On their return they brought with them a specimen, which was placed in Peale's Museum, at Philadelphia, and first described by Mr. Ord, and named *Antelope Americana*. Three years later, in *Journal de Physique*, he gave it a generic distinction under the name of *Antilocapra Americana*.

This animal is not a native of the Old World, and is confined to a very limited portion of the New; that is to say, the western part of the continent, mostly within the temperate zone; and since, as we shall hereafter see, it avoids forests and high mountains, it may not be looked for in many portions of this region. It was never found east of the Mississippi River, nor did it even reach the Missouri River except on its upper part, where it crossed that river in the more arid regions.

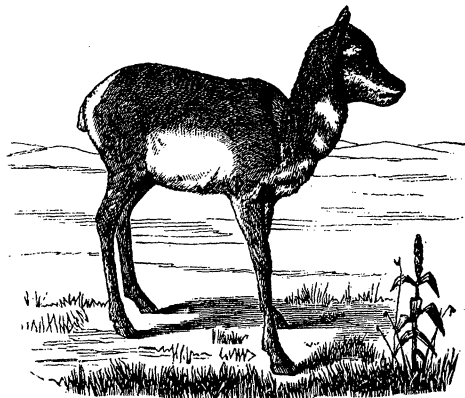
The habits of our antelope explain why it is so confined in its range. Its aliment is strictly herbaceous. It not only rejects arboreous food, but it has such an aversion to forests that it rarely enters them voluntarily, refusing to be driven into them at the greatest peril. True, it will cross thin skirts of timber in passing from one prairie to another, and the old bucks at certain seasons, when they seem inclined to avoid the society of their kind, have been known to seclude themselves in the open, park-like glades of some districts.

They are exceptionally gregarious in their habits, although the immense bands of thousands in which they formerly assem-



(FIG. 10.) PRONG BUCK.

Adult Male, with a longitudinal section of the right horn, showing the core of the horn.



(FIG. 11) KID OF THE PRONG BUCK, FOUR MONTHS OLD.

bled are now broken up by the advancement of civilization, which has absolutely expelled them from those regions where they were met with in great numbers a quarter of a century since. Then they were most abundant in California, where they sometimes almost literally covered the plains and the foot-hills west of the Sierras, and where now a solitary wanderer is rarely heard of. The parks and plains in the mountains and east of them, and the great table-lands separating the distant ranges, are now most affected by our antelope, for there it finds that dry, gravelly soil, covered by a scanty but nutritious vegetation, which its tastes seem to crave and its nature seems to require; there too, only the shepherd and the herder are induced to intrude upon its seclusion and disturb its quiet.

Although Richardson objects to the appellation *Americana*, because there may be two species of the genus, it is now settled beyond dispute that this animal stands alone, a solitary species of a distinct genus among ruminants, as we shall presently see, differing so widely in many important particulars that zoölogical laws which have hitherto been considered well settled have to be abandoned and new ones recognized. *Capra Americana*, which was once supposed by some to be a species of the same genus, is now well established to be a true goat, and no more related to the animal under consideration than is *Ovis montana*, our Rocky Mountain sheep, and in coat and coloring the latter bears a much stronger resemblance to our animal than the former.

In size, the prong buck (Bartlett) is considerably smaller than the ordinary Virginia deer, and less variation among individuals is observed than occurs in any of the deer family. A fully adult male rarely exceeds four feet in length from tip to tip, and three feet in height to the top of the shoulder, while the adult female is considerably smaller. The hunter never has difficulty in throwing the largest upon his horse or upon his shoulder, and walking to camp with him, though if the distance be great he gets heavy, no doubt.

The form is best understood by reference to the illustration, which is taken from life, of a fully adult male standing at perfect ease. The body is short and round, the tail is very short, the neck is rather short, and is carried very erect. The head is rather broad and short, and carried well up. The ears are small and erect.

The hairs of this animal differ from those found on most of

the hollow-horned ruminants, and possess the extreme characteristics generally observed in those of the deer. They are hollow except near the roots and extreme points, and are filled with a sort of light pith something like that found in the quill of the turkey or the chicken. These hairs are quite non-elastic and fragile, in this respect resembling more those of the caribou than of any other quadruped. The points of the hairs are solid, and hence firm and tenacious, while the lower parts are moistened by an oily secretion from the skin which makes them the more flexible and less liable to be broken. Hence they are found to be most fragile one quarter or one third of the way down from their points. There is present an under coat of fur during the winter, but this is less abundant than on most of the deer.

On the belly the hairs are more solid and tenacious, and on the legs and face they are quite so. On the top of the neck is a distinct mane, more pronounced on the male, consisting of long, erect, and firm red hairs, which are less abundant towards the body.

The illustration of the young kid will show that it is of the same color as the adult, only the shades become deeper on the older animals. The face is generally black to yellowish-brown, with white cheeks. Below each ear is a dark brown or dull black patch. The neck and upper part of the body are of a yellowish-tawny color, often deepening to a brownish shade. On the lower part of the sides the belly and the inguinal regions are white, which color extends up between the hind legs, uniting with the white patch on the rump. This white area extends up under the neck, where it is broken into transverse bands by the yellowish-tawny of the neck. On many specimens a tawny line extends down the back to and along the upper side of the tail, dividing the whole patch on the rump, while in others this is entirely wanting. The white color on all the parts where it is present is entirely immaculate.

The entire absence of the hind or accessory hoofs found in most other ruminants early attracted attention, and distinguishes the prong buck from both the deer and the antelope, between which it seems to stand. Externally, then, the foot is short and broad, without distinct curvatures, and resembles the foot of the true antelope much more than that of the deer.

A very important feature of this animal is the glandular system which it is found to possess. Until quite recently these glands have not been made a subject of special study. They are per-

haps best described and located by Dr. Murie. All are dermal glands. Two are sub-auricular, and covered by the dark patches already mentioned. There are two ischiatic glands at the points of the hips below the tail, and another pair is found at the hocks, and there is an interdigital gland on each foot. Besides the ten glands which may be said to be in pairs, there is a single gland on the top of the back at the anterior border of the white patch. There is no lachrymal sinus.

From these glands is emitted an odor more pungent at some seasons than at others, and more observable from the old males than from the females or the young males; still, it is observable in all at all times.

The eye is exceptionally large for the size of the animal. It is much larger than that of any of the deer, the ox, or the horse. The entire exposed part of the orb is intensely black, so that I have never been able by the closest scrutiny to distinguish the pupil from the iris on the living subject. While it is brilliant, it is mild, soft, and gentle. It is the eye of the antelope gazelle, only larger and blacker, as I have often compared them when standing side by side. This animal has been often called the American gazelle. A female gazelle from Asia, in my grounds, showed a disposition to associate and play with a young prong buck, but with no other animal in the grounds. I have seen our antelope weep copious tears, when in deep affliction.

In domestication this animal loses its wild timidity sooner and more completely than any other animal *feræ naturæ* whose domestication I have attempted. When taken young it soon acquires the attachment of a child for the human species, and when captured adult in a short time becomes so tame that it will take food from the hand and follow one by the hour, walking through the grounds. It soon perceives that it has nothing to fear, and then readily bestows its confidence. It is not generally healthy in domestication, probably from the humidity of our climate and the want of some alimentary element which it finds in its native plains. Many are afflicted with scrofula, and some linger and die without any well-defined disease. I have never yet been able to keep one in my grounds for a single year, but am still continuing my experiments.

I have never yet heard of an instance where they have bred in domestication, although the males especially are excessively salacious in their inclinations; but I have yet to learn of a case of actual fertility.

They show a degree of intelligence scarcely surpassed by that of the dog, which would, no doubt, be greatly improved by succeeding generations under the influence of domestication, should that be proved possible. One that was in the constant habit of following me soon became disgusted with the elk which chased him, so that whenever he saw me going towards the gate which opened into the elk park, he would place himself in front of me and try to push me back, and then look up imploringly, and if I turned away in another direction would gambol about in the greatest delight. In the wild state, at least, this animal is possessed of inordinate curiosity, by which it is often beguiled within reach of the hunter. In this it resembles the barren-ground caribou, or our small Arctic reindeer.

It is the swiftest of foot of all known quadrupeds, but it cannot continue the race at high speed for a great length of time, although for a few miles or a few minutes its escape seems like the flight of a bird. While it can make astonishing horizontal leaps, even from a standing position, it cannot or will not make high vertical leaps. I do not think that one under any circumstances could be driven over an obstruction a yard in height.

Like that of all the deer tribe, its sight is defective, since it is unable to readily identify objects without the aid of motion. Its senses of smell and hearing are very acute, and on these it largely depends to warn it of the approach of enemies.

The most interesting of all the characteristics of the goat antelope, that which most distinguishes it from all other ruminants, is its horns. These appendages are given to both male and female, but on the latter they are scarcely more than rudimentary till they are fully adult, and even then they are quite insignificant, varying from one to three inches in length at the uttermost. The horn of *Antilocapra* is hollow, like the horn of the goat and the ox, and it is deciduous, like the antler of the deer. When this peculiarity was announced, it was received with entire incredulity by naturalists, and the world of science accepted the truth only after overwhelming evidence had been accumulated.

The first allusion I find to the deciduous character of the horns of this antelope is in Audubon and Bachman's *Quadrupeds of North America*, ii. 198, where we learn that the hunters at Fort Union told Mr. Audubon that the antelopes shed their horns, but the naturalist "managed to prove the contrary." Again, on page 204, he returns to the subject, but says he was never able to ascertain that they do shed their horns.

Dr. Canfield, of Monterey, California, who lived in the midst of vast flocks of antelope, and had domesticated many of them and intelligently studied them, in 1848, in a communication to Professor Baird, of the Smithsonian Institution, announced the deciduous character of their horns quite circumstantially, and gave many interesting facts connected with the animal, but the professor considered the announcement so extraordinary that he did not feel justified in publishing the communication. Five years later Mr. Bartlett, superintendent of the gardens of the Zoölogical Society of London, himself observed the casting of the horns of an adult male then in the society's gardens, and announced the fact to the society in a paper which was published in its Transactions. Since then it has been admitted by naturalists as an established fact.

From the number of these interesting animals which I have had and still have in a state of domestication, my opportunities for observing them have been good, and I have found it the very luxury of study to observe the progress of the growth and the casting of these horns, and to investigate the mode of growth; and I am sure the reader will bear with me while I give a brief description of the process.

The horn of the antelope grows on a permanent process of the skull which rises upon the supra-orbital arch, so that not an inch of space intervenes on the adult between the base of the horn and the orb itself. When the male kid is born, a protuberance may be felt where the horn is to grow. This grows with the kid, and by the time it is six months old, the little horn breaks through the skin, presenting a sharp, hard point. This horn perfects its growth from the first to the last of January, when it has attained a length of an inch or less, and is then cast off. The next horn is perfected and cast earlier, and so on till full maturity is attained, when the horn is thrown off in October, though in this strict uniformity must not be expected.

On the adult male the horn is about twelve inches long, and the core in the specimen now before me is little more than five inches long. The horn is laterally compressed. The lower half is about two and one half inches wide and one inch thick, the anterior edge becoming sharper towards the prong. Above the prong it is much less compressed, assuming more a cylindrical form; still it is somewhat flattened to the end. The prong, which is anterior and occurs about midway the length of the horn, is scarcely more than an abrupt termination of the anterior part of

the flattened section, where its width is increased to about three and a half inches, terminating in a sharp point; so we may say the prong is one inch in length. But in this different specimens vary considerably.

The horn appears as if constructed of a mass of longitudinal fibres, even presenting a striated appearance, especially the lower part, and is roughened by a great number of small tubercles below the prong to near the base. Many hairs occur on the lower portion of the horn, some of which often remain till the latter is shed. In color the horn is a deep black, except the extreme tip, which is generally a translucent yellowish-white, sometimes for half an inch or more.

If we now confine ourselves to the horn on the adult, we shall the better understand it. Soon after the rut-time is passed, we observe the horn, the shell which envelops the persistent core, lifted from its seat and each day carried up higher and higher, and becoming more and more loose till presently it is thrown off. Then it is revealed to us how this has been done. We look inside the cast-off horn and see that the cavity does not extend above the prong, which is scarcely half-way up the horn. We see that the core was laterally compressed, broad and thin, presenting anteriorly its sharpest edge. The illustration shows the form and extent of this core better than I can describe it in words; and so of the horn itself. I represent the side of the horn cut away so as to show the entire core. As we proceed in our examination we see that when the old horn was thrown off the new horn had already made considerable progress in its growth above the end of the core, and that it was this new growth of horn which had dislocated the old one, completely detached it from the core, and so permitted it to drop off. From the hardened point down to the core, the new horn is warm and slightly elastic and flexible, least so towards the hardened point. To watch the growth of the horn henceforward is exceedingly interesting. It extends in length pretty rapidly, and towards the upper end assumes the posterior curvature as the hardening process, which converts it into true horn, progresses downward. Meanwhile the skin which covered the core, and which was rather sparsely set with long, coarse, lightish-colored hairs, shows no unusual activity. But when the perfected horn reached the top of the core, the upper section of this skin, for an inch perhaps, showed unusual activity, and became thicker, its upper part becoming hard and insensible and finally assuming the consistence of true horn, conforming in



shape to the thin, flat core, only that the new horn projects its anterior edge far beyond the core, thus forming the prong; and so the growth proceeds downward, involving but a limited portion of the skin which covers the core, below which it appears to be in a normal condition and above which is the perfected horn, till finally it reaches the base of the horn, when the growth may be considered perfected. This occurs about the last of July or early in August. The progress of the growth is much slower on the lower part of the horn than it was on the upper part. The lower part of the horn, which envelops the core, is covered more or less with hairs which penetrate it from the skin beneath. These we find more abundant as we pass down the horn in our examination. These at last, however, nearly disappear from the surface, probably by abrasion. As soon as or before the commencement of the rutting season, the horn has completed its growth and has become a perfect weapon, and so continues during that season, which so excites the males to belligerency. As this passes by, the growth of the new horn commences at the top of the core and proceeds as before described, lifting the old horn from its seat and finally throwing it off.

I may not occupy the space requisite to describe the peculiarities of the growth of the successive horns and of the cores, while they are growing from the kid to the fully adult, although they show some interesting phenomena. Suffice it to repeat that the first horn of the kid is shed in January; the next year it completes its growth earlier and is shed in December, and so on each year, the horn being shed a few weeks earlier than was its predecessor, till when the animal becomes fully adult the horn is cast soon after the rutting season is past.

I have never had in domestication an adult female, with horns developed, and cannot say whether they mature and are thrown off at the same times as those of the males.

Apparently the skin covering the core of the horn is converted into horn. The microscope alone can reveal the truth of this, and by its aid the whole is made plain. The core of the horn is first covered by the periosteum. Next, and without any intervening tissues, comes the skin, with its proper epidermis. The horns previously described have their roots in the cellular tissue, or lower stratum of the skin, as we will call it. When sufficiently magnified, the upper or outer part of the skin shows the uneven appearance occasioned by elevations and depressions called papillæ, as is observed on other portions of the skin. Upon this uneven

surface rests the epidermis, if we may use that term, where constant activity is ever present. As this epidermis or outer coating of the skin on the human subject, for instance, is constantly wearing away, so must it be constantly renewed by new growths. For this purpose minute cells are constantly being formed upon or next to the papillæ. The new cells, being at the very bottom, necessarily force up their predecessors, which become more and more flattened out in the form of scales. Of these flattened scales the epidermis is formed; as they approach the surface, they become dryer and harder and of a horny nature, even on the most delicate skin, and in that condition these horny scales or flattened cells are worn off by friction. It is these flattened cells which constitute all horns, hoofs, nails, and claws; and so we are not disappointed when we find that the horns of our antelope are composed of these same flattened and dried-up cells. As these cells are forced up and flattened out, they cohere in a mass large enough to form the horn, and in obedience to some law of nature are molded into the proper form. When enough of these flattened and hardened cells have been accumulated and consolidated to constitute the horn at a given place, it cleaves off from the softer inner portion of the cuticle within, leaving a stratum of epidermis covering the corium.

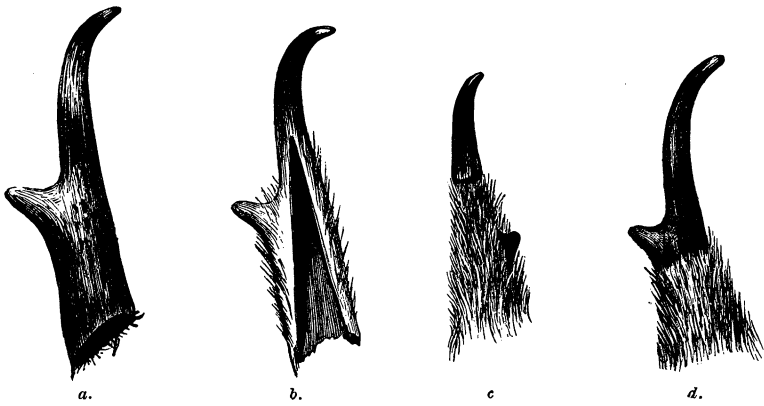
While the mode of growth of this horn so exactly corresponds with that of other and persistent horns, its progress is necessarily widely different. The growth of other horns is very slow and uniform, proceeding from the epidermis at their bases, while this horn, instead of taking a life-time to complete its growth, must be finished in a few months. It is not pushed up and enlarged a little each year by a slow accumulation of these flattened and hardened cells at its base, but it first shoots up with astonishing rapidity from the very top of the core, till the old horn is pushed off and the new one above is far advanced, while over all the rest of the core the cuticle has manifested no unusual activity, but simply a moderate state of vitality is exhibited. When the growth of the horn above the end of the core is completed, the time has arrived for the formation of the new horn below. That part of the epidermis which had been so active and performed such extraordinary work in so short a time relapses into a state of quiet, and a section below has suddenly become aroused to a state of great activity, till it has done its work and completed its horny crust, when in a few days, or weeks at most, it in turn relapses into quiet; and so, as the growth progresses downward,

successive sections become stimulated to great activity, do their work, and subside to quiet, till finally the base is reached and the horn is complete; and now the epidermis has a rest during the rutting season and until the time arrives for the commencement of a new growth, which proceeds as before; and so is it annually repeated.

We can partially understand how it is that the lately active part becomes quiet so soon as the horn over it is perfected, if we will remember that a partial separation takes place between the horn and a sensitive stratum of the epidermis, but I cannot so readily explain how it is that successive sections below are awakened from their state of quietude to an activity nowhere else in nature equaled or even approached for the same purpose. I can only say that the exigencies of the case demand it, and nature supplies the means.

Altogether this is a most interesting animal, requiring peculiar conditions of life for its well-being, which confine it to a very limited area on the face of the earth. The discovery of this animal has opened a new chapter to the naturalist, in which some of his preconceived notions must be rudely swept away, and new possibilities in the animal kingdom recognized. It stands solitary and alone in the middle space where a void was thought to exist, which supposed zoölogical laws had declared could never be filled. It supplies a link in the animal kingdom which we thought could not exist, and which we were slow to recognize when found. It occupies an intermediate place, if it does not entirely fill up the gap, between those ruminants which have hollow and persistent cornuous horns and those which have solid and deciduous ones. It has eight incisors in the lower jaw, and no canine teeth, but twenty-four molars. We find examples of this dental formula in both the aböve groups. In its skin and coat it is like the deer. Its eye is most like that of some of the antelopes. Its glandular system is most like that of the goat. It is the most delicate and particular feeder of all ruminants, while the goat is the most promiscuous consumer. In its salacious disposition it resembles and even excels the goat, but is the farthest of all from it in its ability to climb rocks and precipices. It has many characteristics hitherto supposed to be confined to one or the other of the families of ruminants above referred to, while it exhibits others peculiar to itself.

Since writing this article I have examined the illustrations here reproduced (see Figures 12 and 13), with the late Mr. Hays's



(FIG. 12.)



(FIG. 13.) THE PRONG BUCK. (After HAYS.)

Fig. 12. — *a*. The horn just shed. *b*. A longitudinal section, showing the manner in which the hairs pass through the horn. *c*. The appearance of the horn in January. *d*. Its appearance in April.

article on the growth of the horns of the prong buck, in the NATURALIST, volume ii., page 131, and find some differences between his observations and mine, from which we may infer the want of exact uniformity not only in the structure but in the progress of the growth of the horn. The section of the horn shown in Figure 12 shows a core differing in both form and extent from any I have seen. I have never met one where the core extended above the prong.

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### ARE POTATO BUGS POISONOUS?<sup>1</sup>

BY AUG. R. GROTE AND ADOLPH KAYSER.

A STATEMENT of the poisoning qualities of the *Doryphora decemlineata*, or potato bug, has repeatedly been made in public prints, and notably in the Seventh Report on the Insects of Missouri by Professor C. V. Riley. It is claimed that after coming in contact with the bugs, or inhaling the steam or smoke produced by boiling or burning them, persons have exhibited various symptoms of cutaneous or nervous disease.

To investigate the matter, a quantity of the bugs collected from fields near Buffalo, where no arsenic had been used, was submitted to distillation with salt water, so as to allow of an increased temperature. Under this process, about four ounces of liquid were procured from one quart measure of the insects. This liquid was perfectly clear, and emitted a highly offensive smell; it proved of alkaline reaction on account of the presence of a certain quantity of free ammonia and carbonate of ammonia.

Again, an equal quantity of the bugs was used to prepare a tincture made as follows: Absolute and chemically pure alcohol was condensed upon the live bugs; after a digestion of twenty-four hours the alcohol was evaporated at a gentle heat. The tincture so obtained had a decidedly acid reaction, was brown in color, and was not disagreeable in smell.

To ascertain the effect on the animal system of the liquid and the tincture above described, a number of frogs were procured for the experiment. About one half cubic centimetre of the liquid and the tincture each was introduced separately into the stomach. Neither the liquid nor the tincture produced any apparent effects. The vivacity of the frogs so treated continued unimpaired, notwithstanding the complete retention of the doses. Again, two

<sup>1</sup> Read at the Detroit Meeting of the American Association for the Advancement of Science, 1875.